Name:

at1121exam_practice: Radicals and Squares (v10)

Question 1

Simplify the radical expressions.

$\sqrt{50}$ $\sqrt{63}$ $\sqrt{75}$

$\sqrt{5 \cdot 5 \cdot 2}$ $\sqrt{3 \cdot 3 \cdot 7}$ $\sqrt{5 \cdot 5 \cdot 3}$

$5\sqrt{2}$ $3\sqrt{7}$ $5\sqrt{3}$

Question 2

Find all solutions to the equation below:

$$\frac{(x+9)^2 - 7}{3} = 31$$

First, multiply both sides by 3.

$$(x+9)^2 - 7 = 93$$

Then, add 7 to both sides.

$$(x+9)^2 = 100$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 9 = \pm 10$$

Subtract 9 from both sides.

$$x = -9 \pm 10$$

So the two solutions are $x = 1$ and $x = -19$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 18x = -56$$

$$x^2 - 18x + 81 = -56 + 81$$
$$x^2 - 18x + 81 = 25$$
$$(x - 9)^2 = 25$$
$$x - 9 = \pm 5$$
$$x = 9 \pm 5$$
$$x = 14 \quad \text{or} \quad x = 4$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 - 30x + 71$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 - 10x) + 71$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 - 10x + 25 - 25) + 71$$

Factor the perfect-square trinomial.

$$y = 3((x - 5)^2 - 25) + 71$$

Distribute the 3.

$$y = 3(x - 5)^2 - 75 + 71$$

Combine the constants to get **vertex form**:

$$y = 3(x - 5)^2 - 4$$

The vertex is at point $(5, -4)$.